TENNESSEE GAS PIPELINE COMPANY, L.L.C.

(A KINDER MORGAN Company)

COMMONWEALTH OF MASSACHUSETTS

FIVE-YEAR VEGETATION MANAGEMENT PLAN

(To manage vegetation in the Kampoosa Bog Drainage Basin and to protect workers from poisonous plants throughout the Commonwealth)

2016-2020

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SECTION 1: INTRODUCTION

Tennessee Gas Pipeline Company, LLC (Tennessee), a Kinder Morgan Company, has developed an Integrated Vegetation Management Plan (IVM) in order to manage vegetation at various facilities along its pipeline rights-of-way (ROW) in the Commonwealth of Massachusetts. Vegetation management is critical to maintain gas pipeline rights-of-way facilities that are reliable, accessible, and can be inspected in support of Tennessee's mission: the efficient, uninterrupted delivery of natural gas.

Tennessee currently comprises over 600 miles of high-pressure natural gas pipeline and associated facilities in the Commonwealth of Massachusetts (Appendix 1). It maintains its pipelines on easements ranging from twenty feet in width (on its laterals) up to 120 feet in areas of multiple pipelines.

To allow for the ability to manage vegetation on its ROWs under an IVM program at selected locations in the Commonwealth of Massachusetts, Tennessee hereby submits this Vegetation Management Plan (VMP) to the Massachusetts Department of Agricultural Resources in compliance with 333 CMR 11.00, *Rights of Way Management* regulations (Appendix 2).[1] These locations include the Kampoosa Bog Drainage Basin in Stockbridge and Lee and when necessary, the control of noxious weeds[2] and poisonous plants to reduce exposure and OSHA incidents.

It is particularly important to consider federal regulations that must guide the language and operational guidelines of this VMP. Tennessee must also comply with all applicable federal regulations including, but not limited to, the *Endangered Species Act*, *Migratory Bird Treaty Act*, all applicable Federal Energy Regulatory Commission (FERC) standards and the *FERC Wetland and Waterbody Construction and Mitigation Procedures*, Federal *Occupational Safety and Health Act* (OSHA) regulations, all applicable Department of Transportation (DOT) and Environmental Protection Agency (EPA) regulations. In particular, Tennessee must maintain its ROWs free of encroaching vegetation that may impede visual and physical access to the pipeline.

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[1]Additional pertinent Massachusetts regulations and laws include, but are not limited to: Chapter 132 B, *Pesticide Control Act* (Appendix 3); all pertinent clauses in *Chapter 85 of the Acts of 2000* (Appendix 4); MESA; MGL c.131, *Massachusetts Endangered Species Act* and its regulations, 321 CMR 10.00, *Massachusetts Endangered Species Regulations;* 310 CMR 10.00, *Wetlands Protection* regulations and 310 CMR 22.00, *Drinking Water* regulations of the Massachusetts Department of Environmental Protection.

[2]"NOXIOUS WEED.—The term ''noxious weed'' means any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment." (PUBLIC LAW 106–224—JUNE 20, 2000, TITLE IV—PLANT PROTECTION ACT).

Pursuant to the *Federal Natural Gas Act*, 15 U.S.C. §§ 717 et seq.; the *Federal Natural Gas Pipeline Safety Act*, 49 U.S.C. §§ 60101 et seq., and the *Federal Hazardous Materials Transportation Act*, 49 C.F.R., Part 192 (Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards), Tennessee is required to adopt and implement an ongoing Operations and Maintenance Plan for purposes of maintaining the integrity and safety of its pipeline facilities.

In compliance with 49 CFR, Part 192, Subpart L (Operations), Tennessee must maintain its easement to allow for aerial surveillance of pipeline conditions; to enhance its Damage Prevention Program; to facilitate planned cathodic protection surveys, and to allow access for both routine pipeline maintenance and emergency repairs. In compliance, Tennessee has conducted periodic maintenance mowing of its permanent easement on an average three to five year cycle, mechanical side trimming on a 10-15 year cycle, and limited herbicide applications as necessary.

At this time, the Kinder Morgan pipeline groups, including Tennessee, will continue to rely primarily on mechanical methods to control vegetation on its pipeline easements. Tennessee will also continue to employ an IVM program that combines mechanical, chemical and natural controls to deal with several issues that require a periodic application of herbicides from the Massachusetts *Sensitive Area Materials List*[3] at selected sites under two specific programs.

The first program is an annual program to control noxious weeds and poisonous plants thereby reducing exposure and OSHA incidents. Tennessee personnel are required to maintain installations and appurtances including rectifiers, magnesium groundbeds and test stations along the buried steel pipelines. The plant communities around many of these facilities tend to be dominated by poison ivy which is not effectively or safely controlled by mechanical methods. Tennessee, therefore, contracts spot herbicide treatments for poison ivy at sites identified by operations personnel as having a high risk of exposure.

The second program is an ongoing three to five year treatment program to control invasive plant species and other incompatible species on Tennessee's three pipeline ROWs in the Kampoosa Bog Drainage Basin in the towns of Stockbridge and Lee. This unique natural resource has been designated as an *Area of Critical Environmental Concern*, therefore, in a cooperative effort, Tennessee, the Massachusetts Division of Fisheries and Wildlife, the Nature Conservancy, and the Kampoosa Stewardship Committee produced a joint *Resource Management Plan*. Among other concerns, the management plan identifies invasive plants as a significant threat to the preservation of the Bog and suggests implementation strategies to monitor invasive plant populations and to identify appropriate times and strategies to reduce or eradicate them.

By using selective herbicide applications, Tennessee has minimized the negative impact associated with mechanical mowing and clearing activities within the drainage basin and has successfully managed the pipeline easement through the basin with an IVM program that protects the basin's fragile ecosystem from invasive species.

[3]In a cooperative agreement, the Massachusetts Department of Agricultural Resources ("MDAR") and the Massachusetts Department of Environmental Protection review and evaluate the environmental fate and toxicological data, including eco-toxicological data, of the active ingredients of herbicides before including them for use in *sensitive areas*.

SECTION 2: GOALS AND OBJECTIVES

The primary goal of this VMP is to outline the standard vegetation management operating procedures on Tennessee's ROWs in the Commonwealth of Massachusetts. In full compliance and philosophical agreement with 333 CMR 11.01, Tennessee is "…establish[ing] a statewide and uniform…process which will minimize the uses of, and potential impacts from herbicides in rights-of-way on human health and the environment while allowing for the benefits to public safety provided by the selective use of herbicides."

This plan provides guidance for both Tennessee and contract personnel and serves as a communication link for state and municipal officials, property owners, abutters and the public-at-large. This objective will be accomplished through this VMP, Yearly Operational Plans (YOP) and the appropriate notification documentation and procedures under 333 CMR 11.06-11.07, and with professionalism and courtesy on the part of Tennessee and contract field personnel.

The following are individual objectives of Tennessee's vegetation management program:

1. To maintain ROWs and pipelines ensuring the safe and dependable delivery of natural gas.

2. To minimize and control vegetation that impedes inspections or interferes with the ability to access the ROWs for maintenance or emergencies.

3. To utilize, where appropriate, an IVM program merging the use of herbicides from the Massachusetts *Herbicides Recommended for Use in Sensitive Areas List* (*Sensitive Area Materials List*) with mechanical operations to control noxious and invasive plant species.

4. To encourage stable early successional ecological communities of primarily lower growing grasses and forbs.

5. To encourage the establishment of wildlife habitat that is compatible with and does not interfere with the primary function of the pipelines.

6. To protect the Priority Habitat of State-Listed species.

7. To control invasive, poisonous and other noxious plant species.

8. To follow all sensitive areas restrictions listed in 333 CMR 11.04.

9. To ensure that all vegetation management operations are conducted in a safe, effective manner and in conformity with all federal and state laws, regulations, and permit conditions.

10. To use experienced, trained vegetation management personnel with all appropriate licenses and certifications.

11. To maintain the flexibility necessary to accommodate unique situations and the need for more appropriate techniques in accordance with new regulations, scientific advances, operational experience and/or comments from municipalities, state agencies and contractors (when necessary, following the procedures in 333 CMR 11.05(4)(d)).

SECTION 3: TARGET VEGETATION

Tennessee's goal to establish stable, predominately grass or forb communities along the ROW requires the management of undesirable vegetation types ("target vegetation"). The primary targets under this VMP are noxious vegetation species, including invasive plant species and poisonous plants. At Kampoosa Bog, all woody vegetation is also considered targets to protect the bog.

According to Title 49, Part 195.146 of the Federal Code of Regulations, Tennessee must regularly patrol its pipelines by ground and/or aerial inspections. Tall, dense vegetation impedes the detection of potential problems, and woody vegetation obstructs the visibility of and access to valve sites, pipe corrosion test stations, mile marker posts, and other pipe location markers. The need to identify and reach the pipeline quickly, especially during an emergency situation is vital. Additionally, the routine removal of tall vegetation renders the ROW, and its buried high pressure natural gas pipeline, distinguishable from adjacent properties.

IDENTIFICATION OF TARGET VEGETATION

Target vegetation will be identified and removed to facilitate access to the ROW by contractors with experienced, trained, licensed and certified, professional personnel. The primary target vegetation on Tennessee's ROWs includes, but is not limited to:

1. ***Trees*** such as Aspen, Beech, Birch, Cherry, Maples, Oak and Pines.

2. ***Shrubs*** such as Dogwood, High Bush Blueberry, Mountain Laurel, Speckled Alder, Sumac, Viburnum and Witch Hazel.

3. ***Woody vines and other vegetation*** such as Bittersweet, Greenbrier, wild grapes, and blackberries.

4. ***Invasive plant species*** such as Oriental Bittersweet, Japanese Knotweed, Multiflora Rose, Autumn Olive, Buckthorn, Honeysuckle, Purple Loosestrife and Phragmites.

5. ***Poisonous plant species*** such as Poison Ivy, Poison Sumac, Poison Oak and Giant Hogweed.

Very low growing woody vegetation, grasses and herbaceous vegetation that compete with taller woody vegetation do not generally interfere with the functioning of the pipeline. These early successional ecological communities are also excellent wildlife habitat for many plant, mammal, bird, reptile, amphibian and invertebrate species, including a number of Federal and/or State-listed rare, endangered or threatened species.

A partial list of compatible early successional plants includes, but is not limited to, Low-bush Blueberry, Huckleberry, Sweet Fern, grasses, ferns and wildflowers.

INVASIVE PLANT SPECIES

Invasive plant species pose a significant threat to the natural diversity of native plants, animals and insects.

Invasive plants are characterized by their ability to spread extremely rapidly, especially in abandoned fields, disturbed areas, along watercourses and ROW corridors. Typically, invasive plants possess one or more of the following characteristics:

1. Aggressive growth and maturity
2. Spread quickly by seed, rhizomes (creeping underground stems) and/or adventitious roots (a root that originates from stem or leaf tissue)
3. Have little or no natural pests, pathogens or predators
4. Tolerate or thrives in many environments
5. Can be difficult to remove or control.

Some examples of invasive plants commonly found on ROWs include, but are not limited to:

1. Japanese Knotweed (*Fallopia japonica)*
2. Multiflora Rose (*Rosa multiflora)*
3. Oriental Bittersweet (*Celastrus orbiculata)*
4. Phragmites (*Phragmites australis)*
5. Purple Loosestrife (*Lythrum salicaria)*
6. Autumn Olive (*Elaeagnus umbellate)*.

Many of the non-native, "exotic" invasive plant species in New England were planted intentionally by gardeners, horticulturists and land management organizations for their showy flowers, vigorous growth and fruiting abundance in an effort to attract wildlife, and/or for erosion control. Due to their aforementioned behavior, however, they have spread well beyond their planted areas overwhelming native species and reducing their diverse richness. Many natural habitats are being impacted by multiple invasive species, which accelerates the decline of natural plant and wildlife communities.

Recognizing this serious threat to the natural landscape ecology, Tennessee has developed an IVM strategy to control invasive plants utilizing both mechanical and/or chemical techniques as appropriate.

Our flagship invasive plant control project is at the Kampoosa Bog Drainage Basin in the towns of Stockbridge and Lee. This unique natural resource has been designated as an *Area of Critical Environmental Concern*, therefore, in a cooperative effort, Tennessee, the Massachusetts Division of Fisheries and Wildlife, the Nature Conservancy, and the Kampoosa Stewardship Committee produced a joint *Resource Management Plan*. Over the past ten years, under this program Tennessee has incorporated all reasonable and effective techniques including the selective use of herbicides from the Massachusetts *Sensitive Area Materials List*, to successfully control invasive plants and protect the basin's fragile ecosystem.

Tennessee wishes to retain the option to work cooperatively with other parties, agencies, commissions and abutting landowners to reduce, contain, or otherwise limit the spread of invasive plant species on its ROWs as part of regional or local invasive plant management plans.

POISONOUS PLANTS

Tennessee personnel are required to maintain a variety of facilities along the buried steel pipelines. Among other duties, this entails regular maintenance of unfenced installations and appurtances such as rectifiers, magnesium groundbeds and test stations. The plant communities around many of these installations and appurtances are prone to be dominated by poison ivy which creates unsafe working conditions.

Currently over one hundred unfenced locations may require treatment for poisonous plants. Each identified location requires applications with backpack or hand-held equipment along the ROW access path and up to 400 square feet surrounding the cathodic protection device.

SECTION 4: INTEGRATED VEGETATION MANAGEMENT AND JUSTIFICATION OF HERBICIDE APPLICATIONS

This VMP takes into consideration all factors involved in the maintenance and operation of pipeline ROWs. It reflects Tennessee's intent to prevent any unreasonable adverse effects to the environment and to human safety while supporting Tennessee's primary obligation of transporting natural gas.

Utility IVM programs work in concert with certain stages of ecological succession. Plant life is governed by a relatively predictable process of change in composition or structure known as ecological succession. In New England, succession strives towards the climax forest, but is interrupted by natural or man-made disturbances both intentional and accidental. Natural gas pipeline IVM programs are intentional man-made disturbance that support the delivery of natural gas by encouraging the stabilization of early successional ecological communities.

New England early successional ecological communities are compatible with Tennessee's ROWs. These include grasslands, fields, meadows, wetlands, vernal pools and heaths. All support diverse, well-dispersed plant, animal and insect species populations, including many that are threatened or endangered. However, all these will disappear in time if succession is not interrupted by intervention.

Mechanical and chemical controls are the direct techniques used to manage vegetation (for example, mowing, hand-cutting and herbicide applications). As a result of utilizing these two direct techniques, we are able to provide desirable, lower growing plants an opportunity to form dense and robust communities that compete with the seed germination and survival of taller, unwanted plants. This serves as the natural control component of IVM. Many decades of on-going field observation and research demonstrate that these low growing plant communities inhibit the germination and growth of tree seedlings through competition (for light, moisture, nutrients), assisted by depredation by wildlife (browsing/feeding) and possibly by allelopathy.[4] In other words, natural controls lower the dependence on chemical and mechanical controls, but also depend upon synergistic application alongside the selective use of chemical and mechanical controls for efficacy.

Mechanical methods are a key component of an IVM programs. For example, most conifers do not resprout and can be controlled by mechanical methods. Mechanical methods are used in chemical restricted sensitive areas (333 CMR 11.04). They are also the appropriate treatment method for vegetation over twelve feet in height (per 333 CMR 11.03(5)) and to control areas of thick impenetrable vegetation that restricts access to the ROW.

Mowing and excavation, however, can contribute to the spread of target vegetation; especially invasive plants capable of reproducing from rhizomes or by adventitious roots. Mowing, the least selective of the mechanical methods, may also impact non-target organisms, eliminating food, cover and nesting sites for some wildlife species and also presents the potential for direct takes of slow moving wildlife, nestlings and others not able to get out of the way.

Thoughtful, carefully planned, selective herbicide applications, in combination with mechanical controls actually promote wildlife habitat by encouraging plant species diversity.[5] There is little soil

[4]Research is still underway about the "natural herbicide action" of allelopathy, the chemical inhibition of the germination or growth of plants by other plants. Although scientists have been studying allelopathy since the 1880s, our understanding is not complete, the processes are extremely complicated and the research is still ongoing, as a result, it is still under debate. What is clear is that certain plants move into and dominate an area.

[5] A short list of examples includes: W.C. Bramble and W.R. Burns. *A long-term ecological study of game food and cover on a sprayed utility right-of-way*. Purdue University. 1974. Bulletin No. 918:16; Richard H. Yahner. *Wildlife*

disturbance associated with herbicide applications and the entire target plant, including the roots or rhizomes, is controlled, stopping their spread. Selective herbicide applications are, therefore, much less destructive than mowing to nesting sites and the vegetation cover necessary for food and concealment by wildlife.

In particular, invasive and poisonous plants are best managed by early recognition, and before a little intrusion becomes a large infestation. A quick response with the flexibility to use the appropriate control methods reduces the likelihood of a severe invasion. When aggressive invasive plant root systems are controlled, other desirable native vegetation has an opportunity to reestablish dominance on the site. For example, the health of the Kampoosa Bog depends on controlling the root system of Phragmites which spread by rhizomes. With the addition of herbicide applications over the last fifteen years, this has led to the reestablishing of thriving cattails and associated native wildlife populations. This native ecological community requires a continued commitment on the part of Tennessee and its partners to maintain the bog because of the aggressive nature of Phragmites and other encroaching invasive species. This is particularly true since the bog is adjacent to the Massachusetts Turnpike which is a corridor for the constant re-introduction of invasive species of all types plant, animal and insect.

In long term New England IVM programs, the average herbicide application rate is approximately one pint to two quarts per acre per treatment year in a three-five year treatment cycle.[6] Studies in New York have documented similar reductions in herbicide use through stable plant community management (natural control).[7]

Herbicides, particularly when applied selectively by low-volume methods, dry quickly on the plant surface, thereby significantly restricting the greatest potential for dermal exposure. The use of anti-drift adjuvants in all foliage applications allows technicians to adjust to accommodate changes in wind velocity and further limits the likelihood of unintentional exposure to non-target organisms. No applications are made in situations when there is a reasonable expectation that herbicides will drift from the target, or during measurable precipitation.

At Kampoosa Bog and other treatment sites, Tennessee's Massachusetts ROW IVM program considers sensitive areas under 333 CMR 11.04 as areas that require special attention (See Section 6). The treatment of these areas takes careful thought and planning on the part of Tennessee and its contract personnel. The flexibility of an IVM program is, therefore, perfectly suited to managing sensitive areas because of the ability to apply different control techniques to the appropriate areas. For example, while surface waters require herbicide setbacks, wetlands, such as Kampoosa Bog, are best treated with herbicides (except within 10 feet of standing or flowing water) because herbicide applications have less negative impact on the wetlands than mechanical treatment methods according to the results of various studies including two ROW wetland impact studies conducted pursuant to 333 CMR 11.04(4)(c) (Appendix 5).[8]

Response to More than 50 years of Vegetation Maintenance on a Pennsylvania U.S., Right-of-Way. Journal of Arboriculture 30(2), March 2004: 123; James S. Marshall and L.W. Vandruff. *Impact of Selective Herbicide Right-of-Way Vegetation Treatment on Birds*. Environmental Management, December 2002. Vol. 30, No. 6: 801-806.

[6]*Utility Transmission Forestry Herbicide Use Summary Records* for Vermont Electric Power Company, TransCanada Hydro Northeast, Inc and National Grid USA Electric Companies (see National Grid *5 year VMP 2009-2013*, p. 9).

[7]C.A. Nowak and L.P. Abrahamson, *Vegetation Management on Electric Transmission Line Rights-of-Way in New York State: The Stability Approach to Reducing Herbicide Use,* Proceedings of the International Conference on Forest Vegetation Management, Auburn University, April 1993.

[8]Environmental Consultants, Inc. *Study of the Impact of Vegetation Management Techniques on Wetlands for Utility Rights of Way in the Commonwealth of Massachusetts*. Final report prepared for New England Electric et.al, 1989; Environmental Consultants, Inc. *Determination of the Effectiveness of Herbicide Buffer Zones in Protecting*

Tennessee's also takes into account cultural considerations, or instances in which culturally sensitive areas including those listed in 333 CMR 11.04 (inhabited and agricultural areas) prescribe that the IVM techniques and control methods are adapted or limited. These are areas of a right-of-way in which the economic, agricultural, social and recreational use of the landscape affect the decision making processes. Examples include: golf courses, residential areas, Christmas tree farms, active pasture and crop lands, or where unique situations warrant this consideration. This does not preclude the use of chemical and mechanical controls. Instead, these landscapes can limit or alter their application; for example, target vegetation might not grow in well-kept lawns but may still grow around pipeline facilities.

In conclusion, Tennessee will continue to monitor the most current research in treatment methods and vegetation management products. Furthermore, because of the requirement to maintain early successional ecological communities of very low growing vegetation, Tennessee will also continue to support the habitat of invertebrates, vertebrates and plants that require this type of habitat, many of which are state-listed as endangered, threatened or rare.[9]

Water Quality on New York State Powerline Rights-of-Way. Final report for the Empire State Electric Energy Research Corporation, 1991; K.H. Deubert. *Studies on the Fate of Garlon 3A and Tordon 101 Used in Selective Foliar Application in the Maintenance of Utility Rights of Way in Eastern Massachusetts*. Final Report prepared for New England Electric et. al.,1985; N.H. Nickerson, G.E. Moore and A.D. Cutter. *Study of the Environmental Fates of Herbicides in Wetland Soils on Electric Utility Rights-of-Way in Massachusetts over the Short Term*, Final Report prepared for New England Electric et.al, December 1994; Matt Hickler, NHESP approved Review Biologist, Reports for TransCanada, National Grid, NSTAR Electric, and Northeast Utilities under 321 CMR 10.00 Massachusetts Endangered Species Act Regulations, 2006-2010.

[9]There are many texts on this subject, some of which are listed in the short bibliography in Appendix 8, this is just one excellent example: James D. Oehler ed., Darrel F. Covell, ed, Steve Capel, ed and Bob Long, ed. *Managing Grasslands, Shrublands and Young Forests for Wildlife; A Guide for the Northeast*. The Northeast Upland Habitat Technical Committee, 2006.

SECTION 5: INTENDED VEGETATION MANAGEMENT METHODS

The following is a descriptive listing of Tennessee's intended vegetation management methods detailing the individual techniques available: hand cutting, mowing, foliar treatments, low volume basal treatments, cut stump/surface treatments (CST) and selective trimming. The treatment methods used on any given ROW are based on site sensitivity, regulatory mandates, target species composition, density and height, site access and topography.

GENERAL REQUIREMENTS:

1. FERC *Wetland and Waterbody Construction Mitigation Procedures* from new pipeline certifications since 1983 may restrict mowing in sensitive areas such as wetland and water body crossings. For these wetland ROW crossings, Tennessee must restrict vegetation maintenance over the full width of the permanent ROW:

    a. A corridor centered on the pipeline and up to ten feet wide can be maintained in a herbaceous state
    b. Trees within fifteen feet of the pipeline and greater than fifteen feet in height may be selectively cut
    c. For water body crossings, Tennessee must limit vegetation management to allow a riparian strip at least twenty-five feet from the mean high water mark to revegetate with native plant species across the entire ROW
    d. FERC Certified Projects restrict routine vegetation management along the ROW in the between April 15th – August 1st.

2. ROW access is through the use of established roadways or access point whenever possible.

3. Permission to enter a ROW by any other means must be obtained from the landowner by Tennessee or its contractor(s).

4. Unreasonable site damage or destruction during any phase of the vegetation management operation by the contractor, his agents or employees, must be repaired.

CHEMICAL (HERBICIDE) CONTROL METHODS:

Chemical control methods consist of herbicides applied as mixtures/solutions consisting of herbicide(s), adjuvants, carriers and additives.

The following guidelines are observed in all herbicide applications:

1. Herbicide applications follow all restrictions in 333 CMR 11.00.
2. Herbicide applications follow all sensitive area restrictions in 333 CMR 11.04.
3. All herbicide applications are performed by experienced, trained vegetation management personnel with Massachusetts pesticide applicator licenses working under the direct supervision of a Massachusetts Category 40 certified pesticide applicator.
4. The contractor is responsible for the proper disposal of all excess materials and solutions in accordance with all applicable Federal and State laws, regulations and guidelines.
5. The contractor is responsible for the proper calibration of equipment and/or herbicide application mixes.

6. Mixing takes place according to all restrictions contained in 333 CMR 11.00.
7. Herbicide applications follow the target vegetation restrictions in the FERC *Wetland and Waterbody Construction Mitigation Procedures.*
8. Herbicides are not applied to active pasture land unless permission is granted from the owner of the livestock. With permission, the only herbicides that may be used must be appropriately labeled for use in active pasture land.

FOLIAR: The application of herbicides to fully developed leaves, stems, needles or blades of a plant. The herbicide concentrate is usually mixed or diluted with water and applied as a uniform spray over the plant's foliage. Two types of equipment for foliar treatments are used: back pack and vehicle mounted. Both treatments use low pressure at the nozzle during applications. This technique is generally the most economical and effective method, particularly in medium and high brush density situations and to control noxious and poisonous vegetation that presents a hazard to inspection and maintenance crews. The application period usually extends from early June through the beginning of leaf abscission in the fall when not restricted by regulations.

Low Volume Backpack Foliar Techniques utilize hand-operated pumps or motorized, backpack sprayers. The hand-operated pumps use water to deliver the herbicide mixture. The motorized, backpack sprayer produces an air current that delivers the herbicide mixture in small droplets from the portable three to five gallon spray tank to the target vegetation. Both techniques only require the applicator to dampen or lightly wet the target leaf area, not to the point of runoff. This minimizes the amount of excess herbicide drip from target species onto desirable ground cover. Low volume applications also eliminate the need to bring heavy equipment on the ROW for the transportation of large quantities of herbicide solution.

Vehicle Mounted Techniques generally utilize a 100-500 gallon hydraulic sprayer mounted on a truck, tractor, ATV, or tracked vehicle equipped with hand-held spray guns. The herbicide mixture is directed at individual targets or broadcast for uniform coverage. Specially designed showerhead type nozzles reduce spray volumes and limit droplet fines thus reducing the potential for spray drift off-target. These nozzles deliver effective spray coverage at relatively low spray pressures. This technique is capable of delivering uniform, penetrating spray coverage to dense, tall, target vegetation such as Phragmites and Japanese Knotweed. It is particularly useful for sites where total weed control or pre-emergent herbicide applications are required for fire safety, such as at pumping stations and valve sites or for initial treatment of invasive plants.

The following guidelines are observed in all foliar applications:

1. Anti-drift agents are added to the mix or solution in all foliage applications to reduce the potential of herbicide drift beyond target vegetation. Drift control agents reduce the break-up of sprays into fine droplets and offer increased selectivity, leaf tissue penetration, and herbicide deposition on target plants.
2. Foliar applications are not made:
    a. To target vegetation over twelve feet in height
    b. To target vegetation standing in surface water
    c. Within chemical restricted *sensitive areas* per 333 CMR 11.04
    d. During periods of wind, which are strong enough to bend the tops of the main stems of tree species on the ROW
    e. During periods of moderate or heavy rain fall (where leaf runoff can wash the herbicide off the target plants)

f. Where landowner agreements preclude their use.

3. Foliar treatments are an effective method to convert ROWs previously maintained by mechanical only methods by treating resprouts after a preparatory mowing operation.
4. Foliar treatments are allowed in wetland areas where no standing water is present, as per the Department of Food and Agriculture *Decision Concerning the Wetland Impact Study Conducted Pursuant to 333 CMR 11.04 (4)(C)(2),* dated October, 1995 (Appendix 5).

PRE-EMERGENT TREATMENTS: The use of herbicides that prevent germinating seeds from growing, using the same equipment and guidelines described in the foliar treatments above. Pre-emergent applications are used where season long vegetation control requires "vegetation-free conditions" such as around valve sites. By preventing the growth of vegetation, pre-emergent applications reduce the amount of applied herbicides and the number of applications necessary in a season. This method is used from the early spring to early fall.

CUT STUMP/SURFACE TREATMENTS (CST): The application of an herbicide mixture directly to the cut surface of a stump immediately following or during a cutting operation to prevent resprouts and root suckering. To obtain root control, it is only necessary to treat the phloem and cambium tissue, regardless of the stump diameter. Application equipment includes low-volume, backpack, hand-pump sprayers; hand held squirt bottles; paintbrushes, or sponge applicators.

The following guidelines are observed in all CST applications:

1. CST is used:
    a. To reduce the need to re-treat the same vegetation by controlling the root system
    b. To reduce the visual impact of vegetation management treatments
    c. For its selectivity to protect desirable vegetation
    d. At any time of the year
    e. To prevent resprouts of vegetation over twelve feet in height cut
    f. To chemically treat target vegetation in limited spray sensitive areas where other methods are not appropriate due to the time of year or site sensitivity.
2. CST is best avoided:
    a. During the season of high sap flow
    b. In moderate to heavy stem densities.
3. CST is not used:
    a. In moderate to heavy rains
    b. In deep snow that prevents hand cutting (see Hand Cutting below)
    c. In chemical restricted sensitive areas.

LOW VOLUME BASAL TREATMENT: the selective application of an herbicide, diluted in specially formulated oil, to wet the entire lower twelve to eighteen inches of the main stem of target plants. Using a hand pump backpack unit, the oil enables the herbicide solution to penetrate the bark tissue and translocate within the plant.

The following guidelines are observed in all Low Volume Basal applications:

1. Low volume basal treatments are extremely selective and used:
    a. In areas of low vegetation density
    b. In areas where extreme selectivity is necessary
    c. Any time of year, including in the dormant season when foliage, grasses and herbaceous plant are not obstructing the main stem.
2. Low volume basal treatments are not used:
    a. During periods of rain or when stems are wet
    b. In deep snow that prevents treating the lower twelve to eighteen inches of the main stem of target plants
    c. In chemical restricted sensitive areas.

MECHANICAL METHODS:

Mechanical control methods include mowing, hand cutting and side trimming.

The following guidelines are observed in all mechanical operations:

1. As much as possible, mowing and side trimming takes place in the late summer, fall or winter months to minimize ground disturbance and destruction of nesting bird or turtle habitat.
2. Areas too saturated to support mowing equipment are hand-cut.
3. Tennessee's mowing contractors are expected to repair any rutting and utilize existing permanent stream crossings whenever possible.
4. All mechanical equipment is expected to be in sound operating condition.
5. Treatment crews will have petroleum spill kits available on site in the event of an incident.
6. Mechanical controls are used when conifers exceed six feet in height or are present in wetlands.
7. Mechanical controls are used in no-spray zones or chemical restricted easement areas.

HAND CUTTING: the use of chain and brush saws to remove the stem and/or branches from the plant's root system. Hand cutting is used to remove hazard trees and target vegetation greater than twelve feet tall, to protect environmentally sensitive sites, and where herbicide use is prohibited. Hand cutting is also used on sites where terrain, target species size or sensitivity renders mowing impossible or impractical. Hand cutting may be used at any time of the year.

The following guidelines are observed during cutting operations:

1. Target plants are cut as close to the ground as practical with stump height usually no higher than root swell.
2. Hand cutting shall generally be the mechanical method targeting plants greater than six inches DBH (tree diameter at breast height).

3. Cut stems are slashed and/or diced:
    a. In areas of medium to heavy density target plants, slash is either left parallel to the ROW or in windrows no greater than three feet in height along the edge of the ROW corridor
    b. In areas of very light to light density target plants with under six inch DBH, slash is diced where it falls so that it lies as close to the ground as practical; the diced slash should not exceed two feet in height
    c. Larger trees are limbed and diced
    d. A twenty foot long fire break is maintained for every 100' of windrow.
    e. Slash will not be left in or on waterways, fence lines, stone walls, trails or roads, or in a manner that would permit it to wash into these areas
    f. Slash from yards or recreational sites will be chipped or removed to adjacent areas for disposal.
4. The placement of cut brush/slash must comply with applicable State Fire Marshall's regulations.
5. All cut cherry is removed from active pastures.
6. Chipping is used at sites when dicing or piling are prohibited, impractical or near residences
    a. Wood chips will be removed, or
    b. Scattered uniformly over the site at depths not exceeding four inches.
7. Where applicable, FERC *Wetland and Waterbody Construction Mitigation Procedures*[9] restrict hand cutting in areas such as wetland and water body crossings:
    a. Within the twenty-five foot wide riparian strip at water body crossings (from the mean high water mark), all woody vegetation may be removed in a 10 foot corridor centered on the pipeline and up to ten feet wide
    b. Trees within fifteen feet of the pipeline and greater than fifteen feet in height may be selectively cut.

MOWING: the cutting, severing or shattering of vegetation by large rotary or flail mowers. Heavy-duty mowers, usually ranging from five to eight feet wide, are typically mounted on large four-wheel drive rubber tired tractors or tracked vehicles which may weigh several tons each. Mowing may be used at any time of the year except when deep snow precludes operations.

The following guidelines are observed during mowing operations:

1. Resulting stump height must be less than six inches unless required by regulation.
2. Operators must perform daily integrity inspections of hydraulic systems and carry petroleum spill control equipment on the mowing machines.
3. Operators must use designated access to ROW.
4. Mobile equipment shall not intrude into residential lawn areas without landowner permission
5. Mowing is used on sites:
    a. Where herbicide use is prohibited by regulatory or easement restriction(s)
    b. Where a large number of target plant stems have exceeded maximum control heights and density
    c. Where hand cutting is inefficient and expensive
    d. Where access is required in the short term in areas impeded by high woody vegetation density
    e. Where terrain, site size and sensitivity permit the efficient use of the equipment.

6. To reduce the impact to non-target organisms including food, cover and nesting sites for wildlife, Tennessee schedules routine mowing activities after the primary nesting season which is generally from mid-April to mid-July, except during emergencies or under extenuating circumstances.
7. Hand cutting will be used in areas where mowing is restricted by terrain conditions such as steep, rocky sites, wet soils, residential lawn areas, or next to obstructions such as stone walls and fence lines.
8. FERC *Wetland and Waterbody Construction Mitigation Procedures*[10] from new pipeline certifications since 1983 may also restrict mowing in *sensitive areas* such as wetland and water body crossings. For these wetland ROW crossings, Tennessee must restrict vegetation maintenance over the full width of the permanent ROW:

    a. Within the twenty-five foot wide riparian strip at water body crossings (from the mean high water mark), all woody vegetation may be mowed in a ten foot corridor centered on the pipeline and up to ten feet wide. No mowing within wetlands except for the ten foot strip centered over the pipeline.

9. Great care must be exercised to insure the safety of the general public as mowing brush can throw large chips and debris great distances from the cutting equipment which, when appropriate, requires employing someone to prevent people and animals from coming too close to the work site.

SIDE TRIMMING: the trimming or removal of encroaching tops and/or branches of trees growing on or near the ROW which may cause a hazard, hamper access and/or impede visual inspections. This management technique is usually accomplished by the use of an aerial lift mounted on a street or off-road vehicle, tree climbing is sometimes employed in situations where terrain prevents the passage of equipment. This method is useful in maintaining the edge definition of the ROW corridors, and provides for easier inspections of vegetation conditions during aerial patrols. All trimming activities are performed in accordance with proper arboriculture practices (as outline in the ANSI A300 (PartI) standards) and in compliance with all applicable regulations in order to insure the health and aesthetic value of the trees.

[10]In the process of new pipeline certification for construction, FERC environmental staff makes recommendations that must be followed.

SECTION 6: SENSITIVE AREA IDENTIFICATION AND PROPOSED CONTROL STRATEGIES

Per 333 CMR 11.02, sensitive areas are "any areas within rights-of-way...in which public health, environmental or agricultural concerns warrant special protection to further minimize risks of unreasonable adverse effects." They include, but are not limited to, the following areas:

Water Supplies:

- Zone I's
- Zone II's
- IWPA's (Interim Wellhead Protection Areas)
- Class A Surface Water Sources
- Tributaries to a Class A Surface Water Source
- Class B Drinking Water Intakes
- Private Wells

Surface Waters:

- Wetlands
- Water Over Wetlands
- The Mean Annual High Water Line of a River
- The Outer Boundary of a Riverfront Area
- Certified Vernal Pools

Cultural Sites:

- Agricultural Areas
- Inhabited Areas

Wildlife Areas:

- Certified Vernal Pool Habitat
- Priority Habitat.

Sensitive areas consist of no-spray areas in which herbicide use is prohibited, limited spray areas, and areas that require special treatment recommendations. Protecting these environmentally sensitive sites is accomplished by establishing limited spray and no-spray areas and treatment restrictions based on the sensitivity of each site and the requirement to minimize any unreasonable adverse impacts within that area (See Table 1).

> Only herbicides specified by the Department as acceptable for use in *sensitive areas* pursuant to the Cooperative Agreement [Memorandum of Understanding] executed between the Department of Agricultural Resources and the Department of Environmental Protection on July 1-2, 1987, or future amendments thereto, shall be used in sensitive areas (333 CMR 11.04(1)(d)).

The herbicides included in the resulting *Herbicides Recommended for Use in Sensitive Areas List* (*Sensitive Area Materials List*) will be applied not only to limited spray areas according to the application restrictions in 333 CMR 11.04 but will be the only herbicides used on Tennessee's Massachusetts

ROWs.[11] A current copy of the *Sensitive Areas Materials List* and Massachusetts Department of Agricultural Resources approved active ingredient fact sheets are available at:

http://www.mass.gov/eea/agencies/agr/pesticides/rights-of-way-vegetation-management.html

TABLE 1: CONTROL STRATEGIES FOR *SENSITIVE AREAS*

Sensitive Area	No-Spray and Limited Spray Areas (feet)	Control Method	Restriction Code
Public ***Ground*** Water Supplies	400'	Mechanical Only	None
Primary Recharge Area	Designated buffer zone or 1/2 mile radius	Mechanical, Recommended Herbicides*	24 months
Public ***Surface*** Water Supplies (Class A & Class B)	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, within 400' upstream of water source	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, greater than 400' upstream of water source	10'	Mechanical Only	None
	10'-200'	Recommended Herbicides	24 months
Class B Drinking Water Intake, within 400' upstream of intake	100'	Mechanical Only	None
	100'-200'	Recommended Herbicides	24 months
Private Drinking Water Supplies	50'	Mechanical Only	None
	50'-100'	Recommended Herbicides	24 months
Surface Waters	10'	Mechanical Only	None
	10'-100'	Recommended Herbicides	12 months
Rivers	10' from mean annual high water line	Mechanical Only	None
	10'-200'	Recommended Herbicides	12 months
Wetlands	100' (treatment in wetlands permitted up to 10' of standing water)*[+]	Low-pressure Foliar, CST, Basal Recommended Herbicides	12 months
Inhabited Areas	100'	Recommended Herbicides	12 months
Agricultural Area (Crops, Fruits, Pastures)	100'	Recommended Herbicides	12 months
Certified Vernal Pools	10'	Mechanical Only when water is present	None
Certified Vernal Pool Habitat	10'-outer boundary of habitat	No treatment without written approval per 321 CMR 10.14(12)	
Priority Habitat	No treatment without written approval per 321 CMR 10.14(12)		

Restrictions "24 Months": A minimum of twenty-four months shall elapse between applications
"12 Months": A minimum of twelve months shall elapse between applications

*Massachusetts recommended herbicides for sensitive sites

[+]Per the *DFA Decision Concerning the Wetlands Impact Study* for utilities per 333 CMR 11.04(4)(c)(2).

[11]Manufactures specimen herbicide labels and fact sheets are included in the YOPs.

IDENTIFICATION OF SENSITIVE AREAS

Sensitive areas can be divided into two additional categories that help the individuals assigned the task of identifying and treating them in the field: "readily identifiable in the field" and "not readily identifiable in the field." Readily identifiable in the field areas will be treated, identified and when appropriate, marked according to all applicable restrictions listed in 333 CMR 11.00. Not readily identifiable in the field areas will likewise be treated and marked when appropriate, but they are identified by the use of data marked on maps and collected in the YOP and notification processes.

1. Sensitive areas usually identifiable in the field, include but are not limited to: surface water, some private and public water supplies, wetlands, inhabited and agricultural areas
2. Sensitive areas not usually identifiable in the field, including, but are not limited to: designated public surface water supplies, public ground water supplies, some private drinking supplies, certified vernal pools and Priority Habitat of State-listed Species.

As appropriate, therefore, sensitive areas will be identified and marked in the field by either Tennessee personnel, trained and experienced vegetation management contractor personnel, and/or by individuals trained in the identification of sensitive areas.

The following resources help in the identification of sensitive areas:

1. Tennessee's pipeline alignment sheets, maps, records and institutional knowledge.
2. Tennessee permitting documents, including original construction permits.
3. Massachusetts Department of Environmental Protection water supply maps and/or GIS mapping layers available through MassGIS.
4. Municipal Board of Health maps and lists of identified private wells.
5. Correspondence, meetings and input from municipalities within the forty-five day YOP and twenty-one day municipal right-of-way notification letter review and comment periods and the 48 hour newspaper notification (under 333 CMR 11.06 & 11.07 and Chapter 85 of the Acts of 2000).
6. Correspondence and meetings resulting from Tennessee's abutter notification procedure.
7. A point person who verifies identified sensitive areas and any additional areas that may require special precautions.
8. USGS topographical maps.
9. Information from contractor's knowledge and records.
10. Information from MassGIS.
11. Confidential information from NHESP.
12. A copy of the YOP and VMP.
13. Treatment crew(s) are required to have the following references on the job site to help identify sensitive areas:
    a. Topographical maps (electronic or paper)
    b. Copy of YOP
    c. Any additional information that may become available.

CONTROL STRATEGIES FOR SENSITIVE AREAS:

Mandated sensitive areas will be treated following the restrictions in applicable state and federal regulations. Because Tennessee only uses herbicides from the *Sensitive Areas Materials List* on their entire ROW system in Massachusetts, treatments in "limited spray areas" will follow all operational guidelines and restrictions listed above in Section 5: "Intended Vegetation Management Methods." Treatments in no-spray areas will likewise follow these operational guidelines as well as the guidelines described below and in Table 1.

Wetlands

Pursuant to 333 CMR 11.04 (4) (c) (2), based upon the results of two ROW wetland impact studies, the Massachusetts Department of Agricultural Resources in consultation with the Department of Environmental Protection and the VMP Advisory Panel, made a determination that herbicides, when used at various utilities including gas pipelines, under the guidance of an IVM program and other conditions as set forth in the determination, have less impact on wetlands than mechanical only techniques. Therefore in accordance with the conditions of the Department's determination, Tennessee will selectively apply herbicides to wetland sites, except within ten feet of standing and flowing water and to conifers (Appendix 5).

Public and Private Water Supplies

Appropriate sources and references will be consulted to determine the location of public and private water supplies. Tennessee's YOP maps will include all known public and private water supplies at the time of printing using the sources listed above, and the mapping information used by contract treatment crews will be updated as necessary during the treatment cycle:

1. To aid in the public and private water supply identification process, under 333 CMR 11.01(3)[12], Tennessee requests that during the notification processes under 333 CMR 11.06-11.07 and during the treatment cycle, that public and municipal agencies share information on new or unidentified public and private water supplies.

2. Identified private drinking supplies within one hundred feet of a ROW are included in our permanent records and maps, and landowners are encouraged to post signs on the edge of the ROW to help identify private water supplies (the no-spray treatment area is fifty feet from a private well).

3. A point person will patrol the ROW to verify sensitive areas and buffers are appropriately measured and flagged, and recorded on pipeline alignment sheets for permanent record.

Massachusetts Endangered Species Act

Tennessee recognizes the importance of the Massachusetts Endangered Species Act, M.G.L.C. 131 A, and its significance to ROW vegetation management. Tennessee will comply with all applicable portions of this Act and the regulations promulgated thereunder. Tennessee will also follow the rules and prohibitions directed at human activities which Take Species or

[12]333 CMR 11.01(3): "[The Specific goals of 333 CMR 11.00 are to] Ensure ample opportunity for public and municipal agency input on potential impacts of herbicide application to rights-of-way in environmentally sensitive areas."

alter their Significant Habitat (as of this printing there are no designated Significant Habitat in Massachusetts).

321 CMR 10.14, Massachusetts Endangered Species Act Regulations, Part II Exemptions and 333 CMR 11.04(3)(a-c) exempts utility ROW vegetation management from the permit process under the following condition:

> The management of vegetation within existing utility rights-of-way provided that the management is carried out in accordance with a vegetation management plan approved in writing by the Division prior to the commencement of work for which a review fee shall be charged, the amount of which shall be determined by the commissioner of administration under the provisions of M.G.L. c.7, § 3B…

To comply with this exemption, Tennessee will submit this VMP and YOPs to the NHESP.

The NHESP has delineated areas as Priority Habitat based on the "Best Scientific Evidence Available" to protect State-listed species from a "take." Under the approval process, details about the Priority Habitat of state-listed species that might be affected by our activities and management recommendations are shared with Tennessee under strict confidentiality agreements.[13] Using this data and best management practices, Tennessee and contract personnel will follow the appropriate vegetation management treatment methods within these *sensitive areas* taking all practical means and measures to modify ROW vegetation management procedures to avoid damage to state-listed species and their habitat.

To identify Priority Habitats, Tennessee personnel, NHESP approved review botanists and vegetation management crews must use proper identification procedures. Contractors are, therefore, required to train their personnel to recognize the location of Priority Habitats using one of the following tools: paper maps, GPS coordinates and/or GIS systems.

[13] A map layer of Priority Habitat is available to the general public at http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/, but it is neither specific to the areas of concern for herbicide applications nor does it have detailed data on the species of concern; the exact location and details of their habitat is kept confidential for their protection.

SECTION 7: OPERATIONAL GUIDELINES FOR APPLICATORS

Tennessee relies on independent contractors for vegetation management applications and requires, in a contractual agreement, that contractors comply with all applicable federal and state laws and regulations. In addition to those listed in the "Introduction" and elsewhere above, this includes, but is not limited to applicable OSHA, FIFRA and DOT regulations.

1. Both the contractor and Tennessee are responsible to insure that vegetation management activities are conducted in a professional, safe, efficient manner, with special attention directed towards minimal environmental impact.
2. Tennessee's representative responsible for monitoring, supervising and coordinating vegetation management programs will be identified in the YOPs depending upon the district being treated.
3. The contractor must provide qualified, state licensed and certified personnel to apply herbicides to Tennessee's ROW. "Qualified" should be interpreted to mean those personnel who have been trained to recognize and identify target and non-target vegetation and to be knowledgeable in the safe and proper use of both mechanical and chemical vegetation management techniques.
4. Vegetation management crews will exercise care to insure that non-target organisms are not unreasonably affected by the application of herbicides.
5. Herbicides are only applied in a safe and judicious manner, in compliance with applicable federal and state pesticides regulations.
6. Herbicides are to be handled and applied only in accordance with the labeled directions.
7. Contractors will strictly adhere to all mandated safety precautions directed towards the public, the applicator, and the environment.
8. Herbicide applicators will wear any and all personal protection equipment, as prescribed by the label, while performing treatment to Tennessee's ROW.
9. Applicators will at all times exercise good judgment and common sense during herbicide treatment activities, and will immediately cease the operation if adverse conditions or other circumstances warrant.
10. The contractors' foreman or senior member of the crew must complete daily vegetation management reports. These forms will be submitted to Tennessee and require the following information:
    a. Date, name and address of vegetation management contractors
    b. Identification of site or work area
    c. List of crew members and license numbers
    d. Type of equipment and hours used, both mechanical and chemical
    e. Method of application
    f. Target vegetation
    g. Amount, concentration, product name of herbicide(s), adjuvants, and dilutents with applicable EPA registration numbers
    h. Weather conditions
    i. Notation of any unusual conditions or incidents, including inquiries from the public.

11. All equipment must be maintained in good working condition, and should be of adequate design and functional ability to produce the professional quality of work that Tennessee requires.[14]
12. All vehicles shall be equipped with absorbent material or pads in the event of a spill.
13. The vegetation management program must result in a 95% control of all target species. If less than the desired control is achieved, then the contractor may be held responsible to retreat or remove the remaining vegetation to Tennessee's satisfaction.
14. The owner(s) of the land, over which the ROWs pass, abutters and other concerned individuals will always be treated with courtesy and respect.
15. Permission must be obtained if entering the ROW from private land and precaution and common sense shall be exercised when moving vehicles and equipment.
16. All bar-ways and gates shall be immediately closed, and care must be exercised to prevent the rutting or destruction of roadways or any other form of access.
17. When addressing inquiries or complaints from a landowner, or other concerned person, the foreman of the ROW crew will explain the program in a polite and professional manner:
    a. If there is a demand from a landowner that the vegetation maintenance cease, the foreman should remove the crew and equipment off the property
    b. The Tennessee representative should be contacted as soon as possible and advised of the situation
    c. The crew will not return to that location until given clearance by Tennessee.
18. Treatment crews will not leave litter of any kind on the ROW or adjoining land.

[14]Because Tennessee recognizes the vast variety and performance of herbicide application equipment, Tennessee will not dictate how that equipment should be calibrated to deliver precise amounts of herbicide to effectively control a host of vegetation conditions. Tennessee, therefore, insists that the contractor, who must be duly licensed or certified for herbicide applications, provide the most appropriate application equipment, calibrated to effectively control target vegetation.

SECTION 8: ALTERNATIVE LAND USE PROVISIONS

Tennessee's notification policy includes sending an informational letter to all abutters and landowners explaining the vegetation management program and its rationale. The purpose of this notification letter is to open a line of inquiry and dialogue between Tennessee and landowners. If in the course of this discussion, individuals make reasonable requests regarding treatments on their property, Tennessee will do whatever is within its power to comply with these requests, while staying in compliance with all applicable federal and state regulations.

Copies of the letter and any notification documentation and procedures will be included in the YOPs.

SECTION 9: REMEDIAL SPILL AND EMERGENCY PLAN

This section is offered as a general procedural guide for responding to chemical spills or related accidents (related accidents include but are not limited to fire, poisoning and vehicle accidents). Tennessee contracts with independent, professional, certified herbicide applicators that are responsible for the containment, clean up and reporting of chemical spills or accidents. The following is, therefore, only a guide to the items that ***shall be*** available to the treatment crew in the event of a chemical spill or emergency:

Types of Chemical Spills that Require Action

Chemicals include, but are not limited to the following:

- Herbicides
- Bar and Chain Oil
- Motor and Hydraulic Oil/Fluids
- Diesel Fuel
- Gasoline
- Title 3 Hazmat Materials

Required Spill Response Equipment

As a minimum, the treatment crew should have available on the job site:

- YOP with Emergency Contact List
- Safety Data Sheets(SDS)
- Product Labels
- Product Fact Sheets (when applicable)
- Appropriate absorbent material
- Shovel
- Broom
- Flagging
- Leak Proof Container
- Heavy-duty Plastic Bags

Personal Contact

In the event of **Personal Contact** with hazardous chemicals:

1. Wash affected area with plenty of soap and water
2. Change clothing which has absorbed hazardous chemicals
3. If necessary, contact a physician
4. If necessary, contact the proper emergency services
5. If necessary, follow the procedures for Major or Minor Spills as outlined below
6. Avoid breathing the fumes of hazardous chemicals.

Clean-up Procedures

Although, education and attention will constantly be directed at accident and spill prevention, in the event of an unfortunate incident, the spill response check list included here as Table 6, will be included in the YOPs.

Reference Tables (information subject to change as necessary)

Table 2: Herbicide Manufacturers

MANUFACTURER	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Albaugh Inc.	(800) 247-8013	
BASF Corporation	(800) 832-4357	
Bayer Environmental Science	(800) 334-7577	
Dow Agro Sciences	(800) 992-5994	
Monsanto	(314) 694-4000	
Nufarm	(877) 325-1840	Medical Emergencies
PBI/Gordon Industrial	(877) 800-5556	Medical Emergencies

Table 3: State Agencies

STATE AGENCY	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
MDAR, Pesticide Bureau	(617) 626-1700	A.S.A.P. (within 48 hours)
Massachusetts Department of Environmental Protection, Emergency Response Section	Main Office: (888) 304-1133 (after hours number) Southeast Region: (508) 946-2700 Northeast Region: (978) 694-3200 Central Region: (508) 792-7650 Western Region: (413) 784-1100	For emergencies involving reportable quantities of hazardous materials; Required info: City, street address, site name (if applicable), material
Massachusetts Dept. of Public Health, Bureau of Env. Health Assessment Toxicology Program	(617) 624-5757	
Massachusetts Poison Information Centers	800-682-9211	For medical emergencies involving suspected or known pesticide poisoning symptoms

Table 4: Emergency Services

EMERGENCY SERVICE	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Police/Fire Department	911	
ChemTrec	(800) 424-9300	
Clean Harbors	(800) OIL-TANK	
Pesticide Hotline	(800) 858-7378	PST: 6:30 am-4:30 pm, web: www.NPIC.orst.edu

Table 5: Tennessee's contacts in the case of a spill or accident

Toya Campbell (713) 420-5622	Individual District Managers will be included in the YOPs as appropriate to the treatment area

Table 6: ***Herbicide Spill Procedure (form also to be included in the YOPs)***

REPORTABLE SPILLS: (Spills of reportable quantity of material): FOLLOW STEPS 1-10

NON-REPORTABLE SPILLS: FOLLOW STEPS 1, 2, 3, 4, 7, 8, 9, 10 & 11 and contact the Tennessee representative(s).

Order	ACTION		Done (√)
1	Use any and all PPE as directed by product label or SDS.		
2	Cordon-off spill area to unauthorized people and traffic to reduce the spread and exposure of the spill		
3	Identify source of spill and apply corrective action, if possible stop or limit any additional amounts of spilled product.		
4	Contain spill and confine the spread by damming or diking with soil, clay or other absorbent materials.		
5	Report spills of "reportable quantity" to the Mass. DEP and DAR:		
	Massachusetts DAR, Pesticide Bureau	(617) 626-1700	
	Massachusetts Department of Environmental Protection, Emergency Response Section	Main Office: (888) 304-1133 (after hours number)	
		FILL IN APPROPRIATE REGION(S)	
6	If the spill cannot be contained or cleaned-up properly, or if there is a threat of contamination to any bodies of water, immediately contact any of the following applicable emergency response personnel:		
	local fire, police, rescue	911	
	Tennessee Representative: FILL IN REGIONAL CONTACT	FILL IN	
	Product manufacturer(s) 1 2 3	 1 2 3	
	Chemtrec	(800) 424-9300	
	additional emergency personnel		
7	Remain at the scene to provide information and assistance to responding emergency clean-up crews		
8	Refer to the various sources of information relative to handling and cleanup of spilled product		
9	If possible, complete the process of "soaking up" with absorbent materials		
10	Sweep or shovel contaminated products and soil into leak proof containers for proper disposal at approved location		
11	Spread activated charcoal over spill area to inactivate any residual herbicide		

SECTION 9: QUALIFICATIONS OF THE INDIVIDUAL DEVELOPING THE VMP

Wendy L. Priestley, Ph.D.
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2342 Main Street
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Dr. Priestley's qualifications extend from her education to work experience in the field of herbicide application, crew management and VMP consulting:

Dr. Priestley holds a Ph.D. in American Civilization from The George Washington University, Washington, DC. In this capacity her research, analytical and organizational skill have aided her efforts in writing Vegetation Management Plans.

She has worked both part time and full time since 1985 for Vegetation Control Service, Inc., a consulting and service company that provides vegetation management programs for utilities, government agencies, municipalities, private business and landowners throughout New England. In this capacity, she is a certified pesticide applicator and her experience includes both field and administrative experience in rights-of-way and industrial weed control programs. Since 1985, she has written or co-authored a large number of Vegetation Management Plans for utilities and municipalities both in Massachusetts and throughout New England. She is currently assisting the national IVM Stewardship Council with editing their accreditation standards.